Novel Structures for Extending the Cut Flower Season

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Cut flower growers in New York use several season-extending strategies to produce marketable flowers continuously from spring through fall. Growers use early blooming cultivars, early sites on the farm, cultural practices that warm the soil and plant environment, and a variety of structures to extend favorable growing conditions. Spring bulbs and early-blooming perennials are good options for extending the season. The annual cultivars often selected for early production are stock, campanula, snapdragon, Bells of Ireland, larkspur, godetia, and sweet peas – all species that produce well in the cold, wet conditions typical of our spring weather, and that can be made to bloom even earlier with modest investments in growing structures.

Site selection is important for early field production. The earliest plants should be transplanted into soils that are well drained, because these are the first to warm. Fields should be selected that are protected from cold, desiccating winds, and that have a southerly aspect. Some flower growers use raised beds to create a drier and warmer root zone, and floating row covers, to create a warmer microclimate for the above-ground portion of the plant. And some growers use plastic mulches in various colors to enhance earliness. Use of these simple strategies can extend the season by two weeks or more, and usually produce flowers of superior quality.

Cut flower growers use a number of structures to extend the cut flower season, including low tunnels, walk-in tunnels, and high tunnels. Low tunnels are used widely in commercial vegetable production. They are made by placing #10 wire hoops over the row every 6 to 10' in order to suspend wide or narrow floating row covers over the young plants. This provides wind protection and a few degrees of frost protection. The cost of low tunnels can be as little as $\$.05/ft^2$. The problem that some farmers face is that the flowers outgrow the low tunnels before problems with wind and cold temperatures have abated.

Walk-in tunnels are portable tunnels that may be covered with greenhouse plastic or Typar. They are variable in size, but often measure 10 to16' wide by 100 to 300' long. They have two to three 48" beds. The hoops are slipped over re-bar ground stakes. A rope tied from hoop to hoop is used to form the ridge purlin. The covering is held fast by ropes that are drawn over the top of the structure and are secured to stakes in the ground. The tunnels are tall enough to walk in (hence, the name). The flexible tunnel length enables growers to place a tunnel virtually anywhere on the farm because it is sized to fit into a farms' existing bed spacing. This dimension also allows for the use of commonly available greenhouse film (4-year, 6 mil) or Typar (1.25 $oz.yd^3$ floating row cover). The tunnels are accessed and vented by rolling up the sides. Walk-in tunnels are intermediate between high and low tunnels with respect to wind protection, temperature modification, impact on the timing of crop maturity, ease of construction, and cost (less than $\$.25/ft^2$). These field tunnels produce their blooms three to four weeks ahead of those in the field. In addition to the early flowers listed above, the season's first sunflowers might be produced in these structures. In the summer, the tunnels may be used to keep China asters free of the insects that transmit aster yellows. Walk-in tunnels may be used in the fall to produce a second succession of annuals. These tunnels may be erected after beds are formed in the spring. For earlier production, it may be worthwhile to form beds and erect hoops in the fall.

High tunnels are essentially greenhouses without heaters or automated ventilation. These structures are covered with standard greenhouse plastic. Ventilation is accomplished using roll-up sides. Some growers use portable heating systems to prevent freezing injury to crops. A wide range of sizes is available. Inside the high tunnels, raised beds and wide row covers are frequently used. High tunnels produce the earliest and latest flowers of all the tunnels discussed, and some growers use them to produce their most valuable varieties, including early spring bulbs, lisianthus and lilies. The high tunnels are about a week earlier than the walk-in tunnels because they are larger and are less affected by perimeter cooling. Growers begin planting annuals at the end of March, and start harvesting in mid- to late May. Bulbs are even earlier. Although not nearly as expensive as heated greenhouses, the over $\$2.00/ft^2$ cost of these units can be prohibitive. To reduce unit costs, growers often produce two successions of flowers each year from each bed in a tunnel.